REMARKS

Applicants respectfully request favorable consideration and allowance of the pending claims.

I. Status of the Claims

The original filing fees paid in this application covered 16 claims. Eleven claims have been canceled and nine have been added. So no additional claim fees should be due.

Upon entry of this amendment, claims 1-2, 6-23, and 28-31 remain pending. Claims 3-5, 24-27, and 32-35 are canceled. Claims 38 - 44 are new.

The claims under examination at present, which are pending and not withdrawn, include claims 1, 2, 6, 14, and 36.

Claims 13 and 14 have been amended to make them independent.

New claims 38 and 39 define minimum Pt concentrations. Since these claims depend from claim 1, the maximum Pt concentration is 80 atomic %. The published application at paragraphs [0033] and [0036] provides support for a range of Pt concentrations from 10 atomic percent to a maximum concentration of 80 atomic percent. Claims 38 and 39 are additionally supported by Tables B and C, which provide multiple examples of Pt-Zn-Fe alloys having 28 atomic % or more Pt or having 32 atomic % or more Pt.

The description in paragraphs [0033] and [0036] and in the Examples shown in Tables B and C is sufficient written description support for new claims 38 and 39 under the holding of *In re Wertheim*, 541 F.2d 257; 191 USPQ 90 (CCPA 1976). In *Wertheim*, the court held that a claim directed to a method of preparing an extract having from 35 to 60% solids content was supported by a specification disclosing an extract having from

25 to 60% solids content and two examples in which the extract had 36% and 50% solids content:

> The function of the description requirement is to ensure that the inventor had possession, as of the filing date of the application relied on, of the specific subject matter later claimed by him; how the specification accomplishes this is not material. *In re Smith*, 481 F.2d 910, 178 USPQ 620 (Cust. & Pat.App.1973), and cases cited therein. ***It is not necessary that the application describe the claim limitations exactly***, *In re Lukach*, supra, but only so ***clearly that persons of ordinary skill in the art will recognize from the disclosure that appellants invented processes including those limitations.*** *In re Smythe*, 480 F.2d 1376, 1382, 178 USPQ 279, 284 (Cust & Pat.App.1973). 191 USPQ at 96.
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> In the context of this invention, in light of the description of the invention as employing solids contents within the range of 25-60% along with specific embodiments of 36% and 50%, we are of the opinion that, as a factual matter, person skilled in the art would consider processes employing a 35-60% solids content range to be part of appellants' invention and would be led by the Swiss disclosure so to conclude. Cf. *In re Ruschig*, supra. The PTO has done nothing more than to argue lack of literal support, which is not enough. If lack of literal support alone were enough to support a rejection under §112, then the statement of *In re Lukach, supra*, 442 F.2d at 969, 58 CCPA at 1235, 169 USPQ at 796, that "the invention claimed does not have to be described in ipsis verbis in order to satisfy the description requirement of § 112," is empty verbiage. The burden of showing that the claimed invention is not described in the specification rests on the PTO in the first instance, and it is up to the PTO to give reasons why a description not in ipsis verbis is insufficient. 191 USPQ at 98.

Just as "35 to 60%" in *Wertheim* was supported by an *ipsis verbis* range of 25-60% and two examples of 36 and 50%; here the Pt concentration of at least 28 atomic % or at least 32 atomic % (further limited by the maximum of 80 atomic % as stated in

claim 1) is supported by a disclosed Pt concentration range of 10 to 80 atomic % and disclosure of multiple examples of alloys having 28 atomic % or more Pt or 32 atomic % or more Pt. The present situation is on all fours with the facts in *Wertheim*. Just as Wertheim's "25-60" was deemed to support "35-60," applicants' "between about 10 and about 80 atomic percent" and examples support "28 to 80 atomic %" and "32 to 80 atomic %." Accordingly, since written description support does not require applicant to describe the claim limitations exactly and since the specification clearly shows that applicants possessed compositions having Pt concentrations within the range defined by new claims 38 and 39, claims 38 and 39 have written description support in the specification.

New claim 40 is supported by paragraphs [0097]-[0105].

New claim 41 is supported by paragraph [0053] of the published application.

New claims 42 and 43 are supported by paragraphs [0053] and [0054] of the published application.

New claim 44 is supported by paragraph [0019] of the published application.

II. Request for Continued Examination

A Request for Continued Examination and the appropriate fee was filed on August 11, 2010. The remarks made herein include those submitted in the Response filed on August 11, 2010, the Response filed on September 13, 2010, and additional remarks made in response to the Interview conducted on October 4, 2010. Accordingly, this Supplemental Response and Amendment supersedes the previously filed responses.

III. Summary of Interview

The undersigned thanks the Examiner for the courtesy of the interview with the undersigned attorney, Paul Fleischut, and attorney Nicholas Keppel. The interview occurred October 4, 2010, starting at 10:00 am Eastern Time. The interview involved a discussion of the scope of the claims and the prior art. No agreement was reached with respect to the rejection of the claims as anticipated and obvious over the JP 5-267299 reference. An agreement was reached that the applicants would submit a Supplemental Response and Amendment to further define the claims over the cited JP 5-267299 reference. This paper is the Supplemental Response and Amendment.

IV. Elections/Restrictions

Claim 37 has been marked as withdrawn in view of its dependency on withdrawn claim 35.

V. Claim Rejections Under 35 U.S.C. §§102(b)/103(a)

Reconsideration is requested of the rejection of claims 1, 2, 6, 14, and 36 as being anticipated by or obvious in view of JP 5-267299, hereinafter "Fujii."

A. The Claimed Invention

Claim 1 is directed to an alloy for use as a catalyst in oxidation or reduction reactions, the alloy having these three express requirements:

> platinum at a concentration that is between about 10 and about 80 atomic percent;
>
> zinc at a concentration that is between 24 atomic % and about 70 atomic %; and
>
> at least one of nickel and iron at a concentration that is between about 20 atomic % and about 80 atomic %.

The alloy of claim 1 is required to be an alloy for a fuel cell catalyst. Since the alloy defined by claim 1 requires at least about 10 atomic % Pt, at least 24 atomic % Zn, and at least about 20 atomic % of one of Ni or Fe, the sum of the minimum concentrations of Pt, Zn, and Ni/Fe is at least about 54 atomic %. Since claim 1 employs the transition "comprising," other components may be present in the alloy, but the concentrations of other components, if present at all, may be no greater than about 46 atomic %.

Claim 2 depends from claim 1 and thus requires the concentrations of other components, if present at all, may be no greater than about 46 atomic %. Claim 2 further requires the alloy consist essentially of Pt, Zn, and Ni/Fe and thus excludes other components in concentrations that materially affect the basic and novel characteristics of the alloy defined by this claim. The "consisting essentially of" claim language is an important limitation of the identity and concentration of other elements that may potentially be present. The Office's comment in the advisory action that claim 2 "does not exclude other elements...because applicants have pointed out...that impurities may be present" incompletely characterizes applicants' comments and the specification, particularly paragraph [0031]. "Comprising" and "consisting essentially of" are not co-extensive in claim scope, as explained in MPEP §2111.03, which states:

> The transitional phrase "consisting essentially of" limits the scope of a claim to the specified materials or steps "and those that do not materially affect the basic and novel characteristic(s)" of the claimed invention. *In re Herz*, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976) (emphasis in original) ... ***"A 'consisting essentially of' claim occupies a middle ground between closed claims that are written in a 'consisting of' format and fully open claims that are***

> ***drafted in a 'comprising' format."*** *PPG Industries v. Guardian Industries*, 156 F.3d 1351, 1354, 48 USPQ2d 1351, 1353-54 (Fed. Cir. 1998). See also *Atlas Powder v. E.I. duPont de Nemours & Co.*, 750 F.2d 1569, 224 USPQ 409 (Fed. Cir. 1984); *In re Janakirama-Rao*, 317 F.2d 951, 137 USPQ 893 (CCPA 1963); *Water Technologies Corp. vs. Calco, Ltd.*, 850 F.2d 660, 7 USPQ2d 1097 (Fed. Cir. 1988). For the purposes of searching for and applying prior art under **35 U.S.C. 102** and **103**, absent a clear indication in the specification or claims of what the basic and novel characteristics actually are, "consisting essentially of" will be construed as equivalent to "comprising." See, e.g., *PPG*, 156 F.3d at 1355, 48 USPQ2d at 1355 (***"PPG could have defined the scope of the phrase 'consisting essentially of' for purposes of its patent by making clear in its specification what it regarded as constituting a material change in the basic and novel characteristics of the invention."***). See also *AK Steel Corp. v. Sollac*, 344 F.3d 1234, 1240-41, 68 USPQ2d 1280, 1283-84 (Fed. Cir. 2003) (Applicant's statement in the specification that "silicon contents in the coating metal should not exceed about 0.5% by weight" along with a discussion of the deleterious effects of silicon provided basis to conclude that silicon in excess of 0.5% by weight would materially alter the basic and novel properties of the invention. Thus, "consisting essentially of" as recited in the preamble was interpreted to permit no more than 0.5% by weight of silicon in the aluminum coating.); *In re Janakirama-Rao*, 317 F.2d 951, 954, 137 USPQ 893, 895-96 (CCPA 1963).

Under the standard set forth in *PPG Industries v. Guardian Industries* and endorsed by the MPEP, use of "consisting essentially of" limits the claim to the elements specifically recited and possible additional elements but excludes any element that the specification defines as constituting a material change in the basic and novel characteristics of the invention. The limiting factors are defined at paragraph [0031], which states that an alloy that consists essentially of Pt, Zn, and Ni/Fe is one in which "impurities that do not play a

role in the catalytic activity and/or crystallographic structure of the catalyst may be present to some degree." So, although paragraph [0031] allows impurities to be present to some degree, these impurities cannot be present in quantity or concentration such that the impurities play a role in catalytic activity or affect the crystallographic structure. Any element or concentration of such element that affects the catalytic activity and/or crystallographic structure is therefore excluded.

Claims 6 are 36 require the sum of the concentrations of Pt, Zn, and Fe/Ni be at least about 59 atomic %. In view thereof, the concentrations of other components, if present at all present, can be no greater than about 41 atomic %.

Independent claim 14 requires the sum of the concentrations of Pt, Zn, and Fe be at least 89 atomic %. In view thereof, the concentrations of other components, if present at all, can be no greater than about 11 atomic %. The minimum concentration of Pt is 40 atomic %. The minimum concentration of Fe is 25 atomic %.

B. Disclosure of the Fujii Reference

With the Advisory Action, the Office has provided the Abstract upon which the rejections are based. The following table lists the components and the component percentages obtained from the Abstract and from the MAT translation:

Component	Component % from Abstract	Component % from MAT
Cu	0 - 98	Balance
Ti	0.5 - 50	0.5 - 50
Ag	0.2 - 50	0.2 - 50
Ni	0.2 - 50	0.2 - 50
Pd	0.1 - 50	0.1 - 50
Pt	0.1 - 50	0.1 - 50
Sn	0.1 - 50	0.1 - 50
Zn	0.1 - 50	0.1 - 50
Cr	0 - 50	0.05 - 50
Zr	0 - 50	0.01 - 05

Mg	0.5 - 20	0.5 - 20
Fe	0 - 20	0.03 - 20
Be	0- 10	0.05 - 10
Si	0 - 10	0.04 - 10

The component percentages from the MAT are obtained from paragraph [0008] and are substantially the same as the component percentages in the Abstract provided by the Office. The MAT is more specific than the Abstract as to the minimum concentrations of some components, but the maximum concentrations are all the same. The Abstract clearly and unequivocally establishes that these components are all optional. See after AB of the Office-provided Abstract "***Optionally***, the wiring and/or electrode is coated with Cu alloy preferably contg. $\geq$ 1 ..." The Abstract provided by the Patent Abstracts of Japan and paragraph [0008] clearly and unequivocally establish that the alloy does not contain all of these components. The Fujii reference does not disclose, nor would the ordinarily skilled person have understood, that all of the elements are always present in each coating alloy. Thus, the minimum components in the Tables are not minimum concentrations of an alloy comprising all of these components. Rather, the minimum concentrations define the minimum amount of a component if it is included in the alloy.

The copper concentration is properly characterized as "balance" in the MAT column since Fujii disclose a copper-based alloy. In fact, the alloy is copper-based in view of the following disclosures:

-- In the Abstract provided by Patent Abstracts of Japan, after CONSTITUTION, "The alloy is made of copper ... The compound is made of copper and one of non-metalic [sic] of N and P."

-- Paragraph [0006] of MAT "...using a wiring material in which a ***copper alloy or intermetallic compound*** excellent in conductivity and oxidation resistance, or corrosion resistance was formed on the copper surface."

-- Paragraph [0007] of MAT "Namely, as for this invention, ***a compound of copper*** in which relative oxidation quantity..."

-- Paragraph [0013] of MAT "By forming ***the compound of copper*** excellent in oxidation resistance on the copper interconnect surface..."

-- Paragraph [0017] of MAT "***A copper compound*** is formed by physical or chemical methods..."

-- Paragraph [0018] of MAT referred to the Example and Figure, "Since the surface of the copper interconnect 1 is covered with the ***corrosion-resistant high copper-nickel alloy*** 2..."

-- After AB of the Office-provided Abstract "...the circuit wiring...is coated with a ***Cu compd.*** with N or P to improve..."

-- After CN of the Office-provided Abstract "***Copper alloy, based,*** Cu 0-98..."

These are just several representative citations that establish clearly and unequivocally that the alloy of the Fujii invention is copper-based. The Abstract establishes that at least one of N or P is a required component. The N or P components constitute up to 10 wt% of the copper-based alloys. The Abstract establishes that the other components, i.e., the components listed in the table are merely optional. At AB, the Abstract states: "Optionally, the wiring and/or electrode is coated with ***Cu alloy*** preferably contg. ... " Copper is thus a

component of the Fujii alloy in all embodiments, and the ordinarily skilled person would have understood that it is a major component in view of Fujii's requirement for conductivity.

Fujii thus discloses a protective copper-based alloy to be applied over copper wiring in a semiconductor integrated circuit device. This is not even remotely relevant to catalysis, which is a required feature of claim 1 by virtue of the requirement that the alloy is a fuel cell catalyst. In any event, Fujii's protective copper-based alloy includes one of N or P for the purpose of enhancing the corrosion resistance of the alloy. See the Abstract. The copper based alloy only optionally includes another alloying element. The optional alloying elements include Ag, Be, Cr, Fe, Mg, Ni, Pd, Si, Sn, Ti, Zn, and Zr in various concentrations. See paragraph [0008] of the MAT. Specific alloys disclosed include copper titanium, copper nickel, copper silver, copper nitride, and copper aluminum. See paragraph [0014]:

[0014]As a compound of the copper formed, there is a high corrosion resistance alloy like copper-titanium, copper-nickel, and copper-silver or a copper nitride, for example, and if corrosion resistance is maintained, the thinner one as much as possible of the thickness will be good. It is because these compounds have low conductivity compared with copper, so high speed response nature will deteriorate if it becomes thick. Since it is such, as thickness of a copper compound, 0.001-0.1 micrometer is preferred.

Fujii discloses that the addition of an alloying element presents a technical problem of decreased electrical conductivity. See paragraph [0004]: "... electrical conductivity falls with the increase in the addition of an alloying element. Therefore, it is important technical problem to satisfy the electrical conductivity as a wiring material, ..." Fujii's recognition that conductivity falls with the addition of an alloying element is critical towards understanding the nature of the copper-based alloy to be

deposited over the copper wiring. Regardless of Fujii's express recognition of this problem, the ordinarily skilled person in the art of semiconductor manufacture would understand that a copper coating that has poor conductivity would be detrimental if not fatal to the semiconductor device. In view thereof, the ordinarily skilled person would have understood that Fujii's alloys *necessarily* contain a high percentage of copper. An alloy coating that contains a low concentration of copper and higher concentrations of poorer conductors would be a significant deterrent to adopting Fujii's technology.

Since maintenance of electrical conductivity is important, even critical, to the function of the protective copper-based film as a wiring material, the ordinarily skilled person would understand this disclosure as teaching that the concentration of alloying elements should be sufficient to achieve enhanced corrosion protection, but also should be minimized so as not to unduly impair electrical conductivity. In electronic devices, such as integrated circuits, conductivity is critical. Copper is second only to silver in electrical conductivity, so alloying copper with elements such as Pt, Zn, Ni, or Fe necessarily decreases electrical conductivity of the alloy, and concentrations of these elements that are too high would impair the ability of the alloy to function as a wiring material. The ordinarily skilled person would thus understand that the concentration disclosures in Fujii may be sufficient to enhance corrosion protection, but would also understand that the concentrations should be minimized to avoid deleterious reduction in conductivity.

Claim 1 is neither anticipated nor rendered obvious by Fujii since the cited reference does not disclose or fairly suggest any catalyst material or even any other material having all of the components and component concentrations required by

claim 1. If anything, Fujii materially teaches away from the alloy defined by claim 1.

C. Anticipation

Fujii's disclosures as set forth in the Abstract and the MAT are insufficient to anticipate the claims. Anticipation is not established herein since Fujii merely lists optional alloying elements but does not disclose any alloy containing all three elements in the concentrations required by the claims. As explicitly set forth in MPEP §2131, the standard for anticipation requires a showing that the reference discloses the identical invention as defined by the claims:

> "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). >"When a claim covers several structures or compositions, either generically or as alternatives, the claim is deemed anticipated if any of the structures or compositions within the scope of the claim is known in the prior art." *Brown v. 3M*, 265 F.3d 1349, 1351, 60 USPQ2d 1375, 1376 (Fed. Cir. 2001) (claim to a system for setting a computer clock to an offset time to address the Year 2000 (Y2K) problem, applicable to records with year date data in "at least one of two-digit, three-digit, or four-digit" representations, was held anticipated by a system that offsets year dates in only two-digit formats). See also MPEP § **2131.02**.< "***The identical invention must be shown in as complete detail as is contained in the ... claim.***" *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). ***The elements must be arranged as required by the claim***, but this is not an *ipsissimis verbis* test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

The Advisory Action states that "Applicants arguments are not persuasive for at least the reason that applicants have chosen to use open claim language and more may be present in the prior art and still anticipate and/or obviate the claims." The mere recognition that other elements may be present in the alloy defined by the claims is insufficient to establish anticipation absent a showing that the reference discloses the identical invention defined by the claims. That is, the "identical invention," "complete detail," and "arranged as required by the claim" standards require a showing that the Fujii reference -- as contained in the Abstract and/or the MAT -- discloses an actual alloy comprising Pt, Zn, and at least one of Fe or Ni, and each element is present at some concentration or range of concentrations within or substantially overlapping the claimed concentration ranges. The Abstract provided by the Office is not sufficient to anticipate the claims since this mere listing of optional elements and potential concentrations is not a disclosure of an actual alloy comprising Pt, Zn, and at least one of Fe or Ni within the concentrations required by the claims. The Abstract contains a list of alloying elements that are optional, but ***no alloy having all of the limitations of the claims is disclosed***. Rather, the Abstract discloses "a Cu compd. with N or P to improve the oxidn. resistance and corrosion resistance." This is not a disclosure of the alloys defined by the claims. The next sentence lists the potential alloying elements and the table lists component percentages, but none of this comprises a disclosure of the alloy as claimed.

If anything, the Office has reconstructed the claims by selecting some components based on the claims. This reconstruction, even if such a reconstruction is possible through hindsight, is not commensurate with a showing that the reference discloses the identical invention in which the

elements are arranged as required by the claims that is necessary for anticipation. If anything, therefore, Fujii can only be cited as a potential obviousness reference since the Office must engage in selection and the exact arrangement of claimed elements is absent.

The Office asserts that the claims are anticipated by an asserted disclosure of an alloy comprising:

> Pt in a concentration from 0.03 to 37 atomic percent,
> Zn in a concentration between 0.1 to 63 atomic percent, and
> Fe in a concentration between 0 and 40 atomic percent.

But no such alloy is disclosed, much less in the asserted concentrations. The only alloys actually disclosed in the Abstract and MAT are copper titanium, copper nickel, copper silver, copper nitride, and copper aluminum, so Fujii does not disclose any alloy having the components required by the claims, much less any alloy in which the component concentrations are within the concentration ranges required by the claims. The Office's assertion that a Pt-Zn-Fe alloy is disclosed requires selection of components. Since the Office must select from the list to reconstruct the claims and since no such alloy is actually disclosed in Fujii, the Office cannot show that the Fujii reference describes the alloy "... ***in as complete detail as is contained in the ... claim ....***" Complete detail excludes the kind of selection the Office has engaged in. If Fujii described the alloy in as complete detail as required by the claims, the Office would have been able to cite a paragraph or table or some other discussion that shows the actual alloy. Instead, the reference merely lists potential alloying elements with Cu. As a practical matter, the reference teaches the alloy

no more than the periodic table of elements does. The claims are thus not anticipated.

Another detail that is sorely lacking in the Fujii reference is the concentrations. One of the requirements, by virtue of the minimum concentrations of the alloys summing to 54 atomic %, is the limitation of all other alloying components to 46 atomic % or less. The open language of the term "comprising" does allow other components to be present, but their total concentration can be no greater than 46 atomic %. Anticipation is simply not present herein since the Fujii reference -- both the Abstract and the MAT -- unequivocally discloses a copper-based alloy comprising N or P. The other components are merely optional. The alloy must comprise copper as its predominant component in order to function as a wiring material according to paragraph [0004] of the MAT.

Since Fujii wholly fails to disclose any alloy comprising the three elements in the concentration ranges required by the claims, anticipation can only be based on an assertion that Fujii's disclosure of a very broad genus of alloys allows one to at once envisage the claimed alloy. MPEP § **2131.02** states:

> **A GENERIC CHEMICAL FORMULA WILL ANTICIPATE A CLAIMED SPECIES COVERED BY THE FORMULA WHEN THE SPECIES CAN BE "AT ONCE ENVISAGED" FROM THE FORMULA**
>
> When the compound is not specifically named, but instead it is necessary to select portions of teachings within a reference and combine them, e.g., select various substituents from a list of alternatives given for placement at specific sites on a generic chemical formula to arrive at a specific composition, anticipation can only be found if the classes of substituents are sufficiently limited or well delineated. *Ex parte A*, 17 USPQ2d 1716 (Bd. Pat. App. & Inter. 1990). If one of ordinary skill in the art is able to "at once envisage" the specific compound within the generic chemical formula, the

> compound is anticipated. One of ordinary skill in the art must be able to draw the structural formula or write the name of each of the compounds included in the generic formula before any of the compounds can be "at once envisaged." One may look to the preferred embodiments to determine which compounds can be anticipated. *In re Petering*, 301 F.2d 676, 133 USPQ 275 (CCPA 1962).
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> Compare *In re Meyer*, 599 F.2d 1026, 202 USPQ 175 (CCPA 1979) (A reference disclosing "alkaline chlorine or bromine solution" embraces a large number of species and cannot be said to anticipate claims to "alkali metal hypochlorite."); *Akzo N.V. v. International Trade Comm'n*, 808 F.2d 1471, 1 USPQ2d 1241 (Fed. Cir. 1986) (Claims to a process for making aramid fibers using a 98% solution of sulfuric acid were not anticipated by a reference which disclosed using sulfuric acid solution but which did not disclose using a 98% concentrated sulfuric acid solution.). See **MPEP § 2144.08** for a discussion of obviousness in genus-species situations.

The proper analysis requires consideration of whether a reference disclosing a copper-based protective coating comprising N or P that may ***optionally*** be alloyed with any of Ag, Be, Cr, Fe, Mg, Ni, Pd, Pt, Si, Sn, Ti, Zn, and Zr allows one to "at once envisage" the specific claimed alloy comprising Pt, Zn, and at least one of Fe or Ni in the concentrations required. In this regard, the possible number of binary, ternary, quaternary and other alloys possible from this list is very large. There are 26 different binary alloys comprising Cu (which is a required element in Fujii's Cu-based alloy), one of N or P, and at least one of the alloying elements; 156 ternary alloys comprising Cu, one of N or P, and at least two of the alloying elements; 572 quaternary alloys comprising Cu, one of N or P, and at least three of the alloying elements; and 1430 quinary alloys comprising Cu, one or N or P, and at least four of the alloying elements, and even greater number of senary, septenary,

etc. alloys. In order to anticipate the claims, the ordinarily skilled person would have had to "at once envisage" the alloy comprising Cu, at least one of N or P, Pt, Zn, and at least one of Fe or Ni out of this large number of possible combinations and permutations. That is one or two alloys out of thousands of possibilities. *Meyer's* holding, as endorsed by the MPEP, precludes anticipation since disclosure embracing "a large number of species ... cannot be said to anticipate claims ..."

Applicants' claims are not, however, merely directed to alloys comprising Pt, Zn, and at least one of Fe or Ni generically. Rather, the claims additionally delineate concentration ranges for each element in the alloy. Accordingly, not only would the ordinarily skilled person have to "at once envisage" an alloy comprising Pt, Zn, and Fe/Ni to anticipate the claims, Fujii's disclosure would also have to disclose concentrations within the claimed range. Fujii's disclosure does not anticipate the claims since Fujii does not disclose any alloy in which component concentrations are within the required concentration ranges. Fujii's alloy is stated in the Abstract to be a "Cu compd. with N or P" Copper is thus the base element and is required in very high concentrations since Fujii's invention is directed to copper-based alloys useful as protective coatings over copper wires and thus must be a "wiring material." See [0004] of the MAT. In this respect, high electrical conductivity is required. Accordingly, copper must be present in a sufficiently high concentration in order for the copper alloy protective layer to function effectively as a corrosion resistant film that does not impair the necessary electrical conductivity properties of the underlying copper wire. See paragraph [0004] of the MAT, which discloses that "... electrical conductivity falls with the increase in the addition of an alloying element... " See also paragraph [0020],

which discloses an alloy in which the copper concentration was 60%. Importantly, this alloy further contained aluminum, which is also a highly electrically conductive metal. Pt, Zn, Fe, and Ni are much less electrically conductive than copper. See, e.g., **http://environmentalchemistry.com/yogi/periodic/electrical.html**, which shows that Pt and Fe have about 16% of copper's conductivity and Zn and Ni have about 25% of copper's conductivity. Fujii's disclosure, especially paragraph [0004], thus clearly establishes that alloying elements -- like those in claim 1 -- should be present, if at all, only in concentrations sufficient to achieve corrosion protection, but must not be so high as to impair the electrical conductivity of the protective coating.

The alloy defined by claim 1 requires the concentrations of the Pt, Zn, and at least one of Fe and Ni sum to at least about 54 atomic %. Fujii does not disclose any alloy comprising Cu-N/P-Pt-Zn-Fe/Ni in which the copper content is less than 46 atomic % and the other components are present within the claimed concentration ranges. Such an alloy is not within the purview of Fujii's disclosure since Fujii discloses that high concentrations of Pt, Zn, and Fe or Ni would necessarily lower the electrical conductivity of the alloy, which Fujii explicitly disclosed is a result to be avoided.

The alloy concentration ranges disclosed in Fujii at paragraph [0008], such as 0.1 to 50 wt% Pt, 0.1 to 50 wt.% Zn, 0.3 to 20 wt.% Fe, and 0.2 to 50 wt% Ni, thus must be read with the understanding that Fujii's alloy is based on copper, as disclosed in the Abstract and elsewhere. Accordingly, recitation of a range of Pt from 0.1 to 50 wt% means that if the Pt content can be as high as 50 wt%, the alloy is a binary alloy with Cu and Pt and the copper content is 50 wt% or more. If

other elements are added that may adversely affect conductivity, Cu must remain a major element to maintain acceptable electrical conductivity. Accordingly, the concentrations of all of the other elements must be less than 50 wt%, and likely substantially less than 50 wt%.

Finally, the Office's calculated concentration ranges are misleading. The Office's broad concentration ranges are only possible by constructing alloys that do not meet the claim requirements and are thus irrelevant to anticipation and obviousness. The Office Action states that the component concentrations are:

> Pt in a concentration from 0.03 to 37 atomic percent,
> Zn in a concentration between 0.1 to 63 atomic percent, and
> Fe in a concentration between 0 and 40 atomic percent.

Fujii limits the Pt concentration to 50 wt% An alloy having at most 50 wt% Pt, which is the disclosed maximum, and further comprising the claim 1's minimums of at least 24 atomic % Zn and at least 20 atomic % Fe or Ni can only have at most about 29.8 atomic % Pt. Such an alloy has no copper in it, so it is apparent that the Office has engaged in a reconstruction that bears no relationship to Fujii's disclosure.

The Office's asserted ranges can be shown to be misleading by starting with the Office's assertion that the Pt concentration can be as high as 37 atomic percent. Such a high Pt concentration can only exist in an alloy with a heavy metal such as tin or silver. For example, an alloy comprising 50 wt% Pt and 50 wt% Sn comprises 37.8 atomic % Pt. An exemplary alloy containing 50 wt% Pt and 50 wt% of Ag, which is a slightly lighter element than Sn, contains only 35.6 atomic percent Pt. By substituting the heaviest element in Fujii's list, Sn, with a

slightly lighter element, Ag, the atomic concentration of Pt decreases to below the Office's asserted maximum. The alloys defined by the claims require at least 24 atomic % Zn and at least 20 atomic % Fe or Ni. Substitution of these light elements for the Sn and Ag only serve to further lower the maximum Pt concentration, as will be shown further below.

The Office's assertion that the Pt concentration can be as high as 37 atomic percent is therefore incorrect. Pt concentrations this high can only exist in a 50 wt% Pt alloy comprising heavy elements like Sn and Ag. But these elements are not in claim 1. Claim 1 requires substantial concentrations of Zn and Fe.

So, assuming for the sake of argument that the ordinarily skilled person would have found some reason to prepare an alloy comprising Pt, Zn, and Fe in the concentration ranges disclosed in Fujii, the concentration ranges of each component would be as follows:

> Pt in a concentration from 12.05 to 25.20 atomic percent,
> Zn in a concentration between 42.75 to 74.97 atomic percent, and
> Fe in a concentration between 0.052 to 33.37 atomic percent.

But, this alloy is entirely hypothetical and is not disclosed in the Fujii reference for the reasons stated above. The ranges stated above are calculated from the atomic masses of the elements and the minimum and maximum concentrations in weight percent as shown below:

Element	**Atomic Mass**	**Minimum Concentration**	**Maximum Concentration**

Pt	195.084	0.1	50
Zn	65.38	0.1	50
Fe	55.845	0.03	20

These values may be used to calculate the minimum and maximum concentrations in atomic percent as shown in the following table:

Element	**Mass per 100 grams of alloy**	**Moles per 100 grams of Alloy**	**Atomic Percent**
Pt	50	0.256	25.20%
Zn	49.7	0.760	74.74%
Fe	0.03	0.000537	0.0528%
	Total Moles =	1.017	
Pt	50	0.256	23.88%
Zn	30	0.459	42.75%
Fe	20	0.358	33.37%
	Total Moles =	1.073	
Pt	49.7	0.255	24.97%
Zn	50	0.765	74.97%
Fe	0.03	0.000537	0.0526%
	Total Moles =	1.020	
Pt	30	0.154	12.05%
Zn	50	0.765	59.90%
Fe	20	0.358	28.05%
	Total Moles =	1.277	

Not all of these alloys are relevant to the pending claims since many of these hypothetical alloys contain an iron concentration that is below the claimed minimum of 20 atomic %. A fair comparison requires comparing only alloys that have at least 20 atomic % Fe and 24 atomic % Zn, such as the alloy shown in the following Table, which has 24.37 atomic % Pt:

Element	**Mass per 100 grams of alloy**	**Moles per 100 grams of Alloy**	**Atomic Percent**
Pt	50	0.256	24.37%
Zn	38.25	0.585	55.63%

Fe	11.75	0.210	20.01%
	Total Moles =	1.051	

There is simply no alloy that can be constructed containing only Pt, Zn, and Fe in which the Pt concentration is higher than about 25 atomic% *and less than 50* ***wt%*** *as required by the JP reference* and that also meets the claimed minimum Zn and Fe concentrations. When the Pt concentration is higher than about 25 atomic%, if the alloy is to also have >24 atomic% Zn and > 20 atomic% Fe, then the Pt ***wt%*** will be over 50 wt%.

Assume for the sake of argument that the ordinarily skilled person would have been motivated to prepare an alloy meeting the claim 1 requirements of at least 24 atomic percent Zn and 20 atomic % Fe that maximizes the Pt atomic percent concentration within the limit of the 50 wt% disclosed in Fujii. Such an alloy could be prepared with Sn. This alloy would contain only 29.8 atomic % Pt, as shown in the following table:

Element	**Mass per 100 grams of alloy**	**Moles per 100 grams of Alloy**	**Atomic Percent**
Pt	50.07	0.257	29.8%
Zn	13.52	0.207	24%
Fe	9.62	0.172	20%
Sn	26.79	0.226	26.2%
	Total Moles =	0.861	

If other lighter elements than Sn are added to the alloy, the Pt concentration in terms of atomic percent only decreases.

The Office's ranges, particularly the assertion that the Pt content can arbitrarily be as high as 37 atomic %, is therefore incorrect because it is based on alloys that have no relevance to the pending claims. Alloys having Pt concentrations above 30 atomic %, *if that is to also constitute < 50 wt% Pt as required by the JP reference,* must contain significant quantities of

heavy atoms such as Ag and Sn and necessarily contain less Zn and Fe than is required by the claims. The Pt concentration simply cannot be higher than 29.8 atomic% in an alloy having the claimed minimum Zn and Fe concentrations, *if the Pt is to constitute < 50 wt% Pt as required by the JP reference*.

This exercise is not an admission that such alloys are actually disclosed in Fujii or even would have been obvious. None of these alloys are disclosed. Additionally, none of these alloys would have been obvious since they exclude Cu, which is a required element in Fujii's alloys since a significant copper concentration is necessary in order to maintain conductivity as a wiring material.

Since no alloy having all of the components required in the claims is disclosed in Fujii and since Fujii do not disclose any alloy in which the component concentrations are within the claimed ranges, Fujii's disclosure does not anticipate claim 1 or any of its dependent claims.

Claim 2 requires the alloy consist essentially of platinum, zinc, and at least one of nickel and iron. Fujii's disclosure does not anticipate claim 2 since Fujii's alloy is copper-based and the copper concentration must be high in order to maintain electrical conductivity. Since copper is a major, if not the predominant, element in Fujii's alloy, copper would necessarily affect at least one of the "catalytic activity and/or crystallographic structure of the catalyst." Such elements are excluded from the alloy defined by claim 2. See paragraph [0031] of applicants' specification. In view thereof, Fujii's copper requirement materially affects the basic characteristics of the alloy.

Independent claim 14 requires a minimum Pt concentration of 40 atomic %. According to the correct calculations of the hypothetical alloy, the most Pt that could possibly be present

in a fictional Pt-Zn-Fe alloy having at least 24 atomic % Zn and 20 atomic % Fe is 29.8 atomic %, which is significantly less than the minimum required by the claim. MPEP §2131.03 III states: PRIOR ART WHICH TEACHES A VALUE OR RANGE THAT IS VERY CLOSE TO, BUT DOES NOT OVERLAP OR TOUCH, THE CLAIMED RANGE DOES NOT ANTICIPATE THE CLAIMED RANGE. The maximum Pt concentration of the interpretation of the Fujii reference that is most generous to the Office is not even close to the minimum required by claim 14, so claim 14 is necessarily not anticipated by Fujii.

Independent claim 14 not only requires the Pt concentration be at least 40 atomic %; the Fe concentration must also be at least 25 atomic %. It is possible to formulate hypothetical, non-disclosed alloys based on various elements and concentrations in the Fujii disclosure that contain Pt, Zn, and Fe having the minimum Zn and Fe concentrations required by claim 14 and higher Pt concentrations. Claim 14 requires a minimum Pt concentration of 40 atomic %, a minimum Zn concentration of 24 atomic %, and a minimum Fe concentration of 25 atomic %. The minimum concentration of these components thus sums to 89 atomic percent, so if other components are present, their maximum concentration in terms of atomic % is 11.

For any hypothetical alloy in which the 11 atomic percent balance is to be filled by alloying elements that may possibly raise the Pt atomic % concentration, the alloying elements must have a high atomic weight. The highest atomic weight element in Fujii's list is tin having an atomic weight of 118.71 g/mol. Even if the alloy contains significant quantities of Sn, the concentration of Pt is no greater than about 28 atomic % because the alloy must contain at least 24 atomic % Zn and 25 atomic % Fe to anticipate claim 14. The following table shows the alloy that can contain the maximum Pt atomic percent concentrations

with the minimum Zn and Fe concentrations required by claim 14. The alloy shown in the following table includes tin and the minimum concentrations of all elements shown in the Abstract as having a minimum concentration:

Element	**Minimum Concentration (wt. %)**	**Mass in grams per 100 grams**	**Moles per 100 grams**	**Mole Percent (100 %)**
Cu	0	0	0	0
Ti	0.5	0.5	0.0104	1.13
Ag	0.2	0.2	0.0019	0.20
Ni	0.2	0.2	0.0034	0.37
Pd	0.1	0.1	0.00094	0.10
Pt	0.1	50	0.256	27.72
Sn	0.1	21	0.177	19.13
Zn	0.1	14.6	0.2233	24.15
Mg	0.5	0.5	0.021	2.22
Fe	0	12.9	0.231	24.98
		Total Moles =	0.925	

The alloy shown in this table has 24.15 atomic % Zn and 24.98 atomic % Fe, which is approximately the requirements of claim 14, which requires a minimum zinc concentration of 24 atomic % Zn and 25 atomic % Ni. This alloy includes the maximum concentration of Pt allowed by Fujii of 50 wt.% in combination with as much Sn as possible to still meet the claimed Fe and Zn concentrations. Again, Sn is maximized since it is the highest atomic weight element in Fujii's disclosure and inclusion of Sn maximizes the concentration of Pt in terms of atomic %. If other elements of lower atomic weight are chosen, the Pt concentration can only be lower than that shown in the Table. Inclusion of Sn in the alloy allows the Pt concentration to be as high as 27.72 atomic %, which is significantly lower than the minimum 40 atomic % required by claim 14. The Office's asserted Pt concentration can only be correct if the alloy has so much Sn as to have concentrations of Zn and Fe that are below the claimed minimums. Claim 14 is thus necessarily not anticipated

in view of MPEP §2131.03 III since there is no combination of Pt, Zn, and Fe with other disclosed elements that results in an alloy meeting the minimum Pt concentration of claim 14.

D. Obviousness

The comments above with respect to anticipation additionally pertain to obviousness. *Prima facie* obviousness is not established herein since Fujii does not disclose or suggest any alloy comprising Pt, Zn, and Fe/Ni in which the components have concentrations within the claimed concentration ranges. See MPEP §2143.03, which states that "All Claim Limitations Must be Considered." Additionally, *CFMT, Inc. v. Yieldup International Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003) establishes that "obviousness requires a suggestion of all limitations in a claim," citing *In re Royka*, 490 F.2d 981, 985 (CCPA 1974). See also *Ex Parte Alan Gerwitz*, Appeal 2009-006223 (February 24, 2010), 2010 WL 676170 at *9 (BPAI). A proper obviousness determination requires that the Office make "a searching comparison of the claimed invention – *including all its limitations* – with the teaching of the prior art." *See In re Wada and Murphy*, Appeal 2007-3733 (January 14, 2008), *citing In re Ochiai*, 71 F.3d 1565, 1572 (Fed. Cir. 1995)(emphasis in original). Further, the Supreme Court held that obviousness is a question of law based on underlying factual inquiries, including ... ascertaining the differences between *the claimed invention* and the prior art. *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966) (emphasis added). MPEP §904 instructs examiners that "The first search should cover the invention as described and claimed, including the inventive concepts toward which the claims appear to be directed."

In sum, it remains well-settled law that obviousness requires at least a suggestion of all of the features in a

claim. *See In re Wada and Murphy, citing CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003) and *In re Royka*, 490 F.2d 981, 985 (CCPA 1974)). Fujii discloses a copper-based alloy comprising N or P used to protect copper wiring in a semiconductor integrated circuit device. In the Abstract, the alloy is referred to as a "Cu compd. with N or P" and "Copper alloy, base, Cu ...." Copper is thus the basic component of the alloy, as evidenced by the disclosure that maintaining high conductivity is important and the disclosure of certain alloys that contain, e.g., 60% copper with aluminum, and by the reference in [0014] to *only* "copper-titanium, copper-nickel, and copper-silver or a copper nitride."

Since the actual alloy defined by the claims is not disclosed anywhere in the references, the Office can only establish *prima facie* obviousness by providing a reason why the ordinarily skilled person would have selected not just one, or even two, but all three element from the list and prepare an alloy meeting all of the limitations of the claims. The requirement that the Office state a rational is set forth in MPEP §2142 states:

> The key to supporting any rejection under 35 U.S.C. **103** is the clear articulation of the reason(s) why the claimed invention would have been obvious. The Supreme Court in *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, ___, 82 USPQ2d 1385, 1396 (2007) noted that the analysis supporting a rejection under 35 U.S.C. **103** should be made explicit. The Federal Circuit has stated that ***"rejections on obviousness cannot be sustained with mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness."*** *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006). See also *KSR*, 550 U.S. at ___ , 82 USPQ2d at 1396 (quoting Federal Circuit statement with approval). <

Herein, the Office must provide a reason why the ordinarily skilled person would have selected all three of Pt, Zn, and Fe from the list of alloying elements and combine them into one alloy with the required components Cu and one of N or P and further provide a rationale for preparing such an alloy in which the Pt, Zn, and Fe concentrations are within the claimed range. No such reasoning has been provided in either the Office Action or the Advisory Action since the Office has just assumed that Fujii discloses the alloy. This assumption is simply incorrect. Fujii discloses a lengthy list of possible alloying elements and a few actual copper-based alloys comprising a single alloying element. The reference does not disclose any alloy meeting the claimed limitations nor does the reference provide any reason whatsoever for selecting all three components out of the list. *Prima facie* obviousness is thus not established.

If anything, Fujii materially teaches away from the alloys defined by the claims. Although the alloy may optionally contain additional elements added to enhance corrosion protection, as stated in paragraph [0004] of the MAT, "electrical conductivity falls with the increase in the addition of an alloying element." This is a material teaching away from any alloy which comprises a substantial quantity of any element other than copper. See MPEP §2141.02 Part V.:

> **VI. PRIOR ART MUST BE CONSIDERED IN ITS ENTIRETY, INCLUDING DISCLOSURES THAT TEACH AWAY FROM THE CLAIMS**
> A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984)

Fujii's disclosure is a material teaching away from the claimed invention since the Abstract and MAT disclose that the copper-

based alloy is intended for use as a protective covering over a copper wire in a semiconductor integrated circuit device. Electrical conductivity of the copper wire is a critical consideration in the manufacture of IC devices, so any coating layer that may impair electrical conductivity is undesirable and must be avoided. Fujii's disclosure that alloying elements decrease the electrical conductivity materially teaches away from any concentration of alloying elements beyond a minimum needed to achieve the required corrosion enhancement. In view thereof, Fujii's alloys, e.g., the 60% Cu-40% Al alloy, contain substantially more copper than alloying elements. The ordinarily skilled person would not have found any reason whatsoever to have modified Fujii's elements in order to prepare an alloy having the requirements of claim 1, which defines an alloy comprising at least 54 atomic % Pt, Zn, and at least one of Fe or Ni since such an alloy would have substantially less electrical conductivity than an alloy having more than 50 atomic % copper.

In view of the foregoing, claim 1 is non-obvious over Fujii, and applicants' respectfully request the rejection be withdrawn.

Fujii teaches away from the alloys of the dependent claims, which consist essentially of platinum, zinc, and at least one of nickel and iron as required by claim 2 or contain even higher concentrations of Pt, Zn, and Fe/Ni in the alloy as required by claims 6, 14, and 36.

For example, claim 14 requires the platinum concentration be at least 40 atomic % and the Fe concentration be at least 25 atomic %. Under the interpretation that is most generous to the Office's position, claim 14 requires a minimum Pt concentration that is substantially more than the maximum Pt concentration that is possible in view of Fujii's disclosure, as shown above

in connection with the remarks on the non-anticipation of claim 14. That is, an alloy containing the at least 24 atomic % Zn, at least 25 atomic % Fe, 50 wt.% Pt, and the maximum amount of Sn in order to maximum the Pt atomic % concentration has only 27.72 atomic % Pt, which is substantially less than the minimum 40 atomic % required by claim 14. There is no disclosure in Fujii that would have caused the ordinarily skilled person to even contemplate such an alloy in view of Fujii's requirement of a significant Cu concentration in order to maintain conductivity. Even if the ordinarily skilled person would have found a reason to prepare a Pt-Zn-Fe alloy also containing Sn in order to maximum the Pt atomic % concentration, such an alloy falls very short of the minimum Pt concentration of claim 14. Claim 14 is thus clearly non-obvious in view of Fujii, which limits the Pt concentration to a much lower concentration than the claim.

VI. New Claims

New claim 38 is patentable under even the interpretation most generous to the Office's position. The maximum platinum concentration according to the proper calculations of a hypothetical Pt-Zn-Fe alloy having at least 25 atomic % Fe is 27.72 atomic percent, which is less than the minimum 28 atomic % concentration required by claim 38. Since the maximum possible concentration does not touch the minimum concentration of claim 38, the reference cannot anticipate claim 38. Additionally, claim 38 is non-obvious since the Fujii reference does not disclose any such hypothetical Pt-Zn-Fe alloy, but even if the ordinarily skilled person would have found it obvious to alloy Cu with Pt, Zn, and Fe, Fujii's requirement for conductivity on par with a copper wire would require substantial copper content in their coating material, which would necessarily limit the Pt

concentration to far less than the theoretically possible 27.72 atomic %.

New claim 39 is also patentable under even the interpretation most generous to the Office's position. New claim 39 depends from claim 1 and is thus directed to an alloy containing at least 32 atomic % Pt, at least 24 atomic % Zn, and at least 20 atomic % Fe or Ni. The following table shows the compositions of the two hypothetical alloys that may be prepared from Fujii's disclosure. The components of these alloys were specifically selected to maximize the Pt concentrations:

Element	**Minimum Concentration (wt.%)**	**Mass in grams per 100 grams**	**Moles per 100 grams**	**Mole Percent (100 %)**
Cu	0	0	0	0
Ti	0.5	0.5	0.0104	1.17
Ag	0.2	0.2	0.00185	0.21
Ni	0.2	0.2	0.00341	0.382
Pd	0.1	0.1	0.000939	0.105
Pt	0.1	50	0.256	28.69
Sn	0.1	24.5	0.206	23.11
Zn	0.1	14	0.214	23.98
Mg	0.5	0.5	0.021	2.30
Fe	0	10	0.179	20.05
		Total Moles =	0.893	
Cu	0	0	0	0
Ti	0.5	0.5	0.0104	1.18
Ag	0.2	0.2	0.00185	0.21
Ni	0.2	10.5	0.179	20.17
Pd	0.1	0.1	0.000939	0.106
Pt	0.1	50	0.256	28.89
Sn	0.1	24.2	0.204	22.98
Zn	0.1	14	0.214	24.14
Mg	0.5	0.5	0.021	2.32
Fe	0	0	0	0
		Total Moles =	0.887	

The first alloy in the table comprises 23.98 atomic % Zn and 20.05 atomic % Fe, which is reasonably close to the claimed

minimums of 24 atomic % Zn and 20 atomic % Fe. This alloy contains Sn in order to maximum the concentration of Pt in terms of atomic %. The Pt concentration of this alloy is 28.69 atomic %, which is significantly less than the claimed minimum of 32 atomic %. Any substitution of Sn with lower atomic weight elements would only lower the Pt concentration. Any increase in the Sn concentration would only decrease the Zn and Fe concentrations to below the claimed minimums. This alloy thus maximizes the Pt concentration while still meeting the Zn and Fe requirements, and the Pt concentration is lower than the claimed minimum.

The second alloy in the table comprises 24.14 atomic % Zn and 20.17 atomic % Ni, which is reasonably close to the claimed minimums of 24 atomic % Zn and 20 atomic % Ni. This alloy contains Sn in order to maximum the concentration of Pt in terms of atomic %. The Pt concentration of this alloy is 28.89 atomic %, which is significantly less than the claimed minimum of 32 atomic %. Any substitution of Sn with lower atomic weight elements would only lower the Pt concentration. Any increase in the Sn concentration would only decrease the Zn and Fe concentrations to below the claimed minimums. This alloy thus maximizes the Pt concentration while still meeting the Zn and Ni requirements, and the Pt concentration is lower than the claimed minimum.

Since the Pt concentration is lower than the minimum required by claim 39, anticipation is precluded. Claim 39 is also non-obvious since the ordinarily skilled person would not have found any reason to prepare such alloys given Fujii's requirement that the alloy be copper based.

New claim 40 requires the alloy be a particulate material. Fujii's alloys are disclosed to be layers over a copper wiring.

Fujii's layers could not be particulate and still function as corrosion barriers.

New claim 41 requires alloy of claim 1 is supported on electrically conductive carbon support particles. New claim 42 requires the alloy of claim 1 is supported on electrically conductive polymer supports. New claim 43 requires the alloy of claim 1 is on the surface of a proton exchange membrane and in contact with a fuel cell anode. Each of these claims further clarify the alloy as a fuel cell catalyst on a carbon particle support, a polymer support, or a proton exchange membrane. These claims are patentable over the Fujii reference since Fujii only discloses their alloy as a corrosion inhibiting layer on a copper wiring and do not disclose any other substrates for the layer. Additionally, Fujii do not disclose or even suggest any use for their alloys as catalyst materials.

Claim 44 requires the alloy of claim 1 is an unsupported catalyst layer on a surface of an electrolyte membrane or on a surface of an electrode. Fujii only discloses their alloy as a layer over a copper wiring and do not disclose or even suggest that the alloy is a catalyst in a fuel cell on an electrolyte membrane or electrode substrate.

CONCLUSION

In view of the foregoing, applicants request issuance of a Notice of Allowance for all pending claims.

Respectfully submitted,

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